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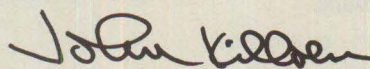
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Thanks for reading **Information Technologies**.

Sincerely,



John Killoren

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4811 S. 76TH ST., SUITE 210

MILWAUKEE, WI 53220-4362

(414) 423-2420

FAX: (414) 423-2433

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PUBLISHING

VICE PRESIDENT, PUBLISHING

John Killoren

EDITOR

Thomas E. Sprague

MANAGING EDITOR

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CIRCULATION COORDINATOR

Iлона Malek

ADVERTISING SALES REPRESENTATIVES

Lori Marchek Ext. 128 (West)

Tracy Rogers Ext. 121 (East)

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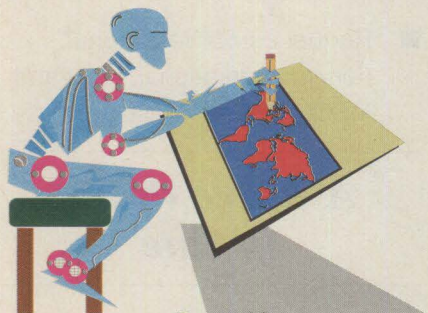
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OS/2

Part 1

A Systems Programmer's PC Operating System

By Robert L. Crauford

Since the IBM PC was introduced more than a decade ago, it has gone through rapid evolution. The first PCs used 5.25" floppy diskettes and had 64K to 256K of memory. Old hands at data processing claimed this to be a marvel, since the first mainframes they worked on may have only had 64K. Soon, PCs matured to 640K with a 10MB hard drive. This 640K barrier placed addressing limits in the MS-DOS environment, just as the 16MB line acted as a glass ceiling to MVS.

Applications for MS-DOS circumvented this limitation by using expanded and extended memory. As these applications grew, the amount of data that could be handled also significantly increased. By this time, many PCs had grown to a CPU based on the INTEL286 micro chip, and had 1MB or 2MB of RAM memory and a hard drive with the capacity of 40MB to 80MB. Data capacity on diskette had also progressed from a 5.25" floppy disk capable of storing 360K to a 3.5" firm plastic diskette capable of storing 1.44MB.

Today, top of the line configurations consist of an INTEL486 chip, 8MB to 32MB of RAM memory, and hard drives of 120MB and up. MS-DOS has been the usual operating system until the last few years. Microsoft introduced Windows to give IBM-compatible PC users a graphical interface like the one Apple Computer users had. Microsoft and IBM jointly

developed OS/2 Version 1 and have now gone their separate ways. This first attempt at a multitasking operating system was only utilized by a few large corporations. It was limited to running applications written for OS/2 or one DOS application at a time. This one DOS application ran in the "penalty box," which was an icon for a full-screen DOS application. To limit this even further, the DOS application did not run in the background, it was halted and swapped out if another OS/2 application was selected. OS/2 Version 2.0 was developed by IBM and now the entire industry is debating whether DOS, Windows or OS/2 will be the standard PC operating system.

Three Operating Systems in One

OS/2 allows for the execution of both DOS and Windows applications, as well as new applications written specifically for OS/2. These other operating system environment applications can be migrated to the OS/2 Workplace Shell so that they can be launched from an icon.

Multitasking

OS/2 allows concurrent execution of many applications on the same PC. By pointing at the desired OS/2 window and clicking the mouse button once, users can easily switch between applications. This capability yields a high productivity gain for power users. The active window is the "foreground window," which is where the user is currently working in an application. All other windows that open concurrently with the foreground window are "background windows." Windows that are not active in foreground processing can still be running an application. Processing in a background window con-

tinues even though the user is active in the foreground window. This capability allows you to be recalculating a large spreadsheet in a DOS window, printing a mail merge in another DOS window, running your word processing and backing up a subdirectory from the hard drive to diskette. If you are connected to a host system, all of

the applications icon and click the mouse selection button. This point-and-click is much closer to how we are used to functioning.

Imagine the productivity gain and increase of user acceptance for the following object-oriented application scenario. Our example application is a hospital emergency room.

**OS/2
Version 2.0 was
developed by IBM and now
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this can continue while you work in both CICS and TSO sessions concurrently. There is a little performance degradation to the applications running in the background, but they continue. Imagine utilizing all of the capabilities of the hardware for PC-oriented applications while browsing the source code to a CICS transaction as if at a dumb terminal! This capability finally realizes the potential of a PC and host cooperative environment.

Graphical User Interface (GUI)

Object-oriented is a new approach to working with a computer. In a text-based, command-driven environment, the user has to issue commands to accomplish the desired functions. Object-oriented attempts to provide an interface to the computer that is closer to how humans normally work with items.

Let's examine the following analogy to clear up this philosophy of interactions between humans and hardware. In the DOS environment, when a PC is turned on, you end up with a DOS prompt. Commands must be issued to change to the directory on the hard drive that contains the application. Then the command to execute the application must be issued. If a DOS shell menu system is used, it is still text-based, selections have to be read, then highlighted and selected. In a GUI, object-oriented environment, you just point at

Patients are treated in triage order and often are moved from one treatment area to another in the few hours that they are there. In the common, text-based design, the patient name and insurance information must be taken and keyed in. Then, if tracking of the patient needs to be done, someone must pull up the record and update a field that indicates the patient's location. Let's say the patient is moved to X-Ray, a nurse or unit clerk would have to update the record, and if the patient is admitted, more updates would be required, possibly re-entering all of the patient's pertinent data. With our GUI example, the patient data would be entered. In place of a text-based menu to retrieve, inquire and update patient data, let's replace the screen with a graphical interface that is laid out in the floor plan of the emergency room. The patient's name appears in the room she/he is currently in. If she/he is to be moved to X-Ray, the nurse or unit head clicks on the patient's name, selects an icon, say a wheelchair, and literally moves that patient to X-Ray. Behind the scene of this graphical interface, the actual record updates are made and the X-Ray personnel are notified that a patient is enroute. This graphical, visual representation is a much more comfortable form for humans than the common systems IS departments have up to now delivered.

Work Place Shell, Desk Top

The GUI that OS/2 provides is referred to as the Workplace Shell, or Desktop. It can be compared to a physical desk top environment. Icons in the Workplace shell represent common items found on your desk. There are reference manuals at hand, file folders, a printer and many other objects representing files, applications and devices.

Mouse

Fast and efficient use of a mouse may take a little while to develop. This aiming tool has only two controls: the left and right buttons. The left button is referred to as button one, or the selection button. The selection button is used to select or mark objects. The right button is referred to as button two, or the manipulation button. The manipulation button is used to drag objects and to summon pop-up menus. By pressing both mouse buttons simultaneously when pointing to any open space on the desktop, the active windows list is displayed. The active windows list can also be invoked by pressing <Ctrl> and <Esc> simultaneously.

Window Components

A window is a framed, sizeable area of the display that represents a monitor for each application. The foreground application, the one you are currently working in, has the frame highlighted to designate its status. Every window is made up of the same components used to control the display sessions size, location and status. Across the top is the title bar. The title bar has the application icon at the left. Clicking on this icon in the title bar pulls down a menu that has selections for items such as MOVE, SIZE, FONT, MARK, PASTE and CLOSE. On the right side of the title bar are two squares called the MIN/MAX. By selecting the MIN, the window is shrunk to just its icon; it would need to be double-clicked to be selected once again. By selecting the MAX square, the window is enlarged to nearly the entire monitor's actual display dimensions. This is comfortable for working in sessions for a long period of time when viewing background applications is not necessary. When a window is not at its MAX size, the width and height can be adjusted. If the selected size does not allow for the entire session to be displayed, scroll



bars are available along the right and bottom edges to move the displayed area. It is also possible to select a font from the icon pull-down menu and select a smaller font that will allow the entire application screen to be viewed in the sized window. The actual area the application is displayed in is referred to as the client area.

Online Help and References

There are three different online reference objects to help you learn this new environment:

- **Start Here:** This object folder icon contains information on certain features and describes how to perform specific functions in OS/2.
- **Info:** Contains online references such as REXX information, a command reference, a tutorial, a glossary and access to the README file supplied on the install diskette. The REXX information and command reference icons open to a table of contents when selected. The tutorial offers a nice interactive session that overviews the features and functions of OS/2. When the icon for the glossary is selected, you are presented with a window that is similar to a book with letter-tabs on the pages. You can click on the desired letter to move to the appropriate page or use a search feature to find the desired topic.
- **Master Help Index:** This reference notebook icon is a good place to begin keyword searches from. It describes features and offers definitions. I suggest that topics be searched for in both the master index and the information windows.

Shutdown Procedures

Before rebooting or turning off the OS/2 PC, click the right mouse button on an open spot on the desktop. Select "Shut Down" to ensure that all active windows are terminated cleanly. This will give you the opportunity to halt the shut down and save any active files that are open in any window that currently has an application running. This also saves the current window and desktop configuration so that all of the windows active during this session will automatically be activated the next time OS/2 is booted. Failure to select the system shutdown prior to re-booting or powering of the system may cause loss of data

in cache, and can cause problems such as lockups the next time the system is restarted. Always do the shutdown!

This overview of OS/2 Release 2.0 capabilities is just the beginning. Hopefully, I have introduced you to some of the capabilities. The following parts of this series will look in more detail at some of the other desktop services provided such as 'CUT and PASTE' and OBJECT manipulation. We will also look at some of the supplied productivity applications such as MODEM control

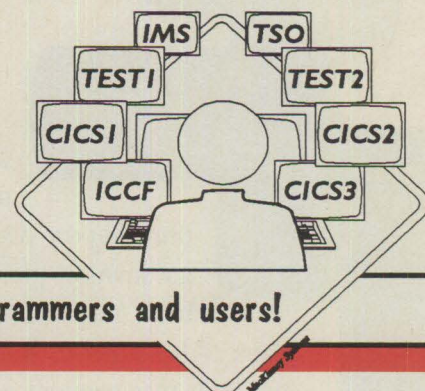
application for accessing IBMLink or NaSCOM, and some of the features of REXX in this environment.

Robert L. Crawford is a systems programmer for Shaner Consultants in Dayton, Ohio. He specializes in LAN and System/390 host connectivity.

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Comparing OS/2 2.0

and

Windows NT

By Al Shing

Few issues in computing have generated as much discussion and controversy as the issue of Windows vs. OS/2. The subject dominates the pages of computing publications and has spilled over to the local newspaper and the morning talk shows. Thousands of messages have been generated on online services, bulletin boards and international networks, endlessly debating the subject.

I have been following the discussion for nearly three years, since the release of Windows 3.0, and through the infamous split between Microsoft and IBM. The issue is primarily religious, and viewpoints seem determined by attitudes toward either Microsoft or IBM. Economics also determines viewpoints. Heavy investment in either Windows or OS/2 will determine one's attitude toward either product.

The Operating Systems

The version of OS/2 that I evaluated was the general release of OS/2 2.0 Standard Edition, with the Service Pack XR6055 installed. A new version, OS/2 2.1, is presently in beta testing and promises to correct many deficiencies currently in OS/2 2.0. It will have Windows 3.1 support and drivers for many more OEM products, such as CD-ROM drives and video cards. There are good and bad reports on this beta release, but it will be very competitive with Windows 3.1.

A beta release of Windows NT was released in October 1992 to recipients of the July 1992 Preliminary SDK. This release was much improved in its stability and in its support of DOS and Windows applications. The new beta release, released in March 1993, has much improved performance, more third-party device drivers and should improve support for DOS and Windows applications. The first preliminary release of the Device Driver Development Kit for Windows NT

was shipped in October and beta drivers for previously unsupported devices are just starting to appear.

As a reference, performance was compared to applications running under DOS 5.0 and Windows 3.1. This environment includes the QEMM 386 6.0 Extended Memory Manager and a graphics accelerator card for Windows (ATI Graphics Vantage). This environment is highly tuned and includes a 5MB permanent swap file, with 32-bit Fast Disk Access enabled. The specific Windows video driver for the graphics accelerator was installed.

Both OS/2 and Windows NT were installed and evaluated on the same 486DX2/50 with 20MB of RAM. Neither system has a video driver available that takes advantage of the graphics accelerator, thus Windows performance on both systems is much slower than the Windows 3.1 installed on the system. There is a driver for OS/2 1.3, but this driver will not work with the Service Pack, which contains the 32-bit Graphics engine. A revised driver is supposed to be available in second quarter 1993. The beta driver for

Windows NT was released in January 1993.

Both OS/2 and NT were installed using default options and then tuned until performance was satisfactory. For tuning OS/2, support and information were obtained from the available support channels (CompuServe OS2SUPPORT Forum, the OS/2 BBS and the IBM National Support Center BBS in Atlanta). Additionally, performance APARS on IBMLINK were researched.

When the general release of OS/2 2.0 was installed, the default option of a high resolution 8514/a was selected for the video card and monitor. This forced Windows applications to run in full-screen mode, instead of in seamless mode—an acceptable trade-off for having the higher resolution. Unfortunately, although performance in OS/2 was acceptable in this mode, performance of Windows applications under Win-OS2 was excruciatingly slow. Several sources suggested that the VIDEO_SWITCH_NOTIFICATION switch be set to ON and that VIDEO_8514A_XGA_IOTRAP be set to OFF. These settings did not help the performance. Additionally, installing the Service Pack also did not improve the performance.

After researching APARS and messages, I found that the slowness of the 8514/a mode was a known problem. The display mode was switched to VGA and then to SVGA, after the Service Pack was installed. Video performance improved immensely and was comparable to that obtained by Windows NT in both VGA and in high resolution mode (using a beta high resolution NT driver from ATI). However, it is only about one-fifth as fast as Windows 3.1 with the graphics accelerator and about half as fast as Windows 3.1 without the graphics accelerator. Seamless Windows support worked fine in SVGA mode, allowing faster execution of Windows applications.

DOS performance appears limited to about 25 percent of the CPU in both OS/2 and NT. Setting a benchmark program's priority higher did not improve its score significantly. The benchmark results were confirmed by running CPU-intensive DOS programs, which ran much slower than they do under

Windows 3.1. This could be due to intentional limiting by the operating system, or it could be due to the multitasking of system tasks active in the system. There were no other applications active during this testing.

Stability

OS/2 and Windows NT are about equally stable at this point. OS/2 locked up twice within a couple of hours after installation, but has not locked up since. NT locked up once, after one of the benchmark programs abended with an invalid instruction. Generally, failing programs are terminated from both systems, without affecting the rest of the system.

Support for DOS programs under OS/2 is excellent. Even programs that do not run correctly under Windows 3.1 run under OS/2. DOS sessions under OS/2 have the use of some 644,352 bytes with no tuning effort involved. NT only provides about 624K at present. DOS support under NT still has a few bugs that need to be corrected. This area should be improved in the next beta release.

Win-OS2 does a good job of running Windows applications, although some programs are not supported. These will likely be supported in the next release. WordPerfect 5.1 for Windows would not run until a program called FIXWP was run against the file WPWINFIL.EXE. WP 5.1 for Windows still ran correctly under NT and Windows 3.1 after this patch. WP 5.2 for Windows did not require this patch to run under OS/2. 1-2-3 for Windows did not have any problems under OS/2, nor did Procomm Plus for Windows.

The major Windows applications also ran correctly under Windows NT. Programs that would not execute correctly were generally shareware type programs or other programs that also had problems under Windows 3.1. These programs would receive System Integrity Violations, or might lock up during initialization or execution. This never happened under Win-OS2, but a message saying that the program was not supported under Win-OS2 might be issued, preventing the program from running at all.

Utility programs such as Central Point PC Tools would not run correctly in either system. This was to be expected, since they usually try to access the

hardware directly and this is not allowed under either system. New releases of these programs that will work with the new 32-bit operating systems will probably become available.

Usability

Usability is an area that has generated much controversy in discussions about the operating systems. The Windows family of products uses a graphical user interface (GUI) that is based on the Common User Access specification of 1989 (CUA 89), while OS/2 2.0 was developed using an updated CUA 91 specification. The Workplace Shell (WPS) in OS/2 is a GUI based on this specification and is object-oriented. Instead of using a menu bar at the top of the window like Windows uses, WPS uses the right mouse button to display a pop-up menu associated with a selected object. An item from the menu is then selected by double-clicking on the selection with the left mouse button.

By default, programs that are minimized into the background are not placed on the desktop. Windows users will be confused by this. There are Systems Settings to allow minimized programs to appear on the desktop, if desired. Double-clicking on icons will display the existing instance of the application, instead of launching a new instance. This, too, may be changed. Many other operations, such as defining applications to OS/2, will be cumbersome to Windows users until they are learned.

Tuning OS/2 is not as simple as tuning NT. Most of the NT tuning tools are up front in the Control Panel or Windows Setup applets, or in the Administrative Tools program group. OS/2 tuning tools are generally hidden behind two layers of pop-up menus. Windows users will need to consult a book or a manual to learn how to perform most tuning operations. OS/2 provides many more tuning options for DOS and Windows sessions than Windows 3.1 or NT.

Support for the CD-ROM drive installed on the system was not installed automatically by OS/2. Support had to be manually installed after installation, and the SCSI driver had to be manually expanded from the installation diskettes and added to the CONFIG.SYS. Even so, the SCSI card was not recognized consistently by OS/2. The parameters for

the SCSI driver had to be adjusted according to information found in the OS/2 BBS that was not contained in the instructions in the README file shipped with the product. Windows NT and the general release of OS/2 2.0 support almost the same limited set of SCSI controllers, thus many CD-ROM drives are not supported by either system. This support is improving for both systems, but users should check the compatibility lists carefully before selecting a CD-ROM drive and a SCSI controller.

Device support in both OS/2 2.0 and Windows NT is limited. There is no support for QIC (Quarter-Inch Cartridge) tape backup units in either operating system. Drivers are being developed by manufacturers and should be available for both systems soon. Central Point Backup is currently not supported by OS/2. NT provides a backup program, but it only supports a (very expensive) SCSI DAT tape backup unit. Presently, neither system supports Stacker or similar disk compression software. Stac Electronics is working on a version of Stacker for OS/2, but it is said to support only FAT partitions in its first release. A version for NT will probably be ready by the time it is released.

An IBM demonstration CD-ROM containing a "demonstration only" version of BookManager Read/2 was loaded and browsed using Presentation Manager. This is a very pleasant way to view and search IBM documentation. The font used by BookManager Read/2 is much easier on the eyes than that used by the Windows viewer provided with the Microsoft Developer's Network CD-ROM. A program for viewing the IBM Online Books CD-ROMs is not available for Windows, although there is one available for DOS.

Overall, the Workplace Shell is very attractive and flexible. Once the differences from the Windows GUI are learned, there should be no trouble using it. However, some training time will be required starting with the tutorial installed with OS/2 and continuing with the manuals. One of the numerous books written about OS/2 will also be helpful.

Connectivity

OS/2 has excellent connectivity to enterprise networks, but none of this support is available in the Standard Edition. Additional packages, such as



Extended Services, TCP/IP for OS/2 and LAN Server for OS/2, are required to achieve the SNA, Novell and UNIX connectivity that is the basis of client/server computing.

Windows NT will also have excellent connectivity options. It will ship with built-in TCP/IP support. An additional product, LAN Manager for NT, will be required for LAN server support. A Windows SNA API has been announced, which will assist third-party developers in developing the SNA connectivity that is available in OS/2. Support for Windows for Workgroups is an integral part of NT.

OS/2 and NT workstations outfitted for typical connectivity will have nearly the same cost per workstation. OS/2 has the edge in this arena because of IBM's stated intent to give client/server abilities to CICS/OS2. IBM's recent announcement of DB2/2 strengthens OS/2's position in the data base arena. OS/2 will support the Network File System that will allow MVS data sets to be accessed transparently. This support is likely to be provided with a third-party product for NT.

Making a Choice

Both OS/2 and Windows NT are excellent operating systems that are very close in capabilities. Both require a substantial machine to run effectively. The differences are mainly in the GUI that is implemented and in the support or lack of support for Presentation Manager or 32-bit Windows. Each system has limitations that will be addressed in future releases.

Neither NT nor OS/2 is currently a match for Windows 3.1 in terms of the sheer performance of DOS and Windows applications. Users who run only DOS and Windows applications will prefer to continue to run DOS/Windows to get the best performance from their applications. Performance will improve for both systems in their next releases.

OS/2 has the best DOS support of all the environments. It runs DOS applications that are problematic under Windows 3.1 and NT. Virtual DOS machines have the use of a full 640K of conventional memory with no tuning required. However, there is a performance penalty in running DOS and Windows under OS/2. If performance is not a concern, and robustness and mul-

titasking abilities are needed for DOS applications, then OS/2 is the best choice.

NT is the future of Windows. An installation that has standardized on Windows applications should consider NT as the advanced operating system of choice. The performance of 16-bit Windows applications should not be a concern by the time NT is released. Once 32-bit applications are available and installed, NT performance should be better than 16-bit DOS/Windows. With C2 security designed into the operating system, NT can be placed on a network without fear of unauthorized access. Companies building networks around Windows for Workgroups may find NT to be a natural choice for a file server.

A choice between operating systems should be made objectively. Flexibility should be maintained, where possible, so that a switch to whichever system becomes dominant can be performed easily. At present, either system could become the dominant platform, or both could be dominated by a Novell-owned UNIX. The next few years will be very interesting, as the marketplace sorts out the competition and a system becomes dominant.



Al Shing is a systems programmer with Sateco Insurance Companies in Seattle, Wash. He specializes in MVS, but also works with UNIX on a RISC/6000 and with DOS/Windows on the PC. His work with Windows NT is part of a personal project to learn Windows programming.

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